



# PROJECT IDENTIFICATION FORM (PIF)

PROJECT TYPE: Full-sized Project

TYPE OF TRUST FUND: GEF Trust Fund

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## PART I: PROJECT INFORMATION

Project Title:	Save the Source: Catalyzing Market Transformation of Breweries from a Major Natural Resource Consuming Industry to a Pro-active Steward for Resource Efficient Cleaner Production		
Country(ies):	Russian Federation	GEF Project ID: <sup>1</sup>	5293
GEF Agency(ies):	UNIDO (select) (select)	GEF Agency Project ID:	SAP ID 120230
Other Executing Partner(s):	Centre for International Industrial Cooperation in the Russian Federation, Volga International Cleaner Production Centre, St. Petersburg National Cleaner Production Centre	Submission Date:	23 January 2013
GEF Focal Area (s):	Multi-focal Areas	Project Duration (Months)	60
Name of parent program (if applicable):		Agency Fee (\$):	598,500
<ul style="list-style-type: none"> <li>• For SFM/REDD+ <input type="checkbox"/></li> <li>• For SGP <input type="checkbox"/></li> </ul>			

### A. INDICATIVE FOCAL AREA STRATEGY FRAMEWORK<sup>2</sup>:

Focal Area Objectives	Trust Fund	Indicative Grant Amount (\$)	Indicative Co-financing (\$)
IW-1	GEFTF	2,800,000	14,500,000
CCM-1	GEFTF	2,000,000	11,960,000
LD-3	GEFTF	1,500,000	4,400,000
(select) (select)	(select)		
Total Project Cost		6,300,000	30,860,000

<sup>1</sup> Project ID number will be assigned by GEFSEC.

<sup>2</sup> Refer to the reference attached on the [Focal Area Results Framework](#) when completing Table A.

## B. INDICATIVE PROJECT FRAMEWORK

**Project Objective: The objective is to demonstrate a replicable approach on how a corporate social responsible beverage industry can go beyond minimizing its direct environmental footprint while becoming a pro-active steward in a public private partnership for resource efficient cleaner production, GHG emission mitigation and sustainable natural resource management along the entire supply chain.**

Project Component	Grant Type <sup>3</sup>	Expected Outcomes	Expected Outputs	Trust Fund	Indicative Grant Amount (\$)	Indicative Cofinancing (\$)
1) Public Private Partnerships with institutions at oblast level (Committee of Natural Resources) for water resource protection, conservation and sustainable water resource management in catchment areas under water stress in which JSC Baltika is a main water user	TA	Capacities of public institutions at oblast level for Integrated Water Resource Management strengthened through public-private partnerships for sustainable water resource management in critical catchment areas	1) Development of a life cycle assessment methodology to measure the environmental footprint of breweries incl. its supply chain based on the cradle to grave methodology to identify further footprint reduction potentials 2) local governments and regional institutions for water resource management assisted in the assessment and modeling of water resources for the sustainable conjunctive use of surface and groundwater in 5-6 locations 3) Joint public-private local community integrated watershed management programmes developed and implemented	GEFTF	700,000	1,950,000
2) Proactive investments in infrastructure for waste water treatment, ground water replenishment and water body restoration in catchment areas under water stress in which JSC Baltika is a main water user	Inv	Stress on water resources reduced, water quality improved, ecosystem services enhanced and water resources previously used by Baltika become available to other users	1) <input type="checkbox"/> Bt water treated beyond the regulatory requirements for brewery effluents so that it can be re-used for the replenishment of depleted aquifers 2) Additional waste water treatment process for brewery effluents developed so that the treated waste	GEFTF	1,400,000	10,550,000

<sup>3</sup> TA includes capacity building, and research and development.

			<p>water can be re-used for water efficient and nutrient recycling drip irrigation.</p> <p>3) Waste water treatment capacities in a community upstream of Baltika breweries improved by the establishment of constructed wetlands</p> <p>4) Previously drained wetlands and autochthon riparian vegetation restored along water bodies</p>			
3) Reduction of environmental footprint of agri industries along the supply chain of JSC Baltika breweries	TA	Environmental pressure on competing land uses exerted by agro-industrial industries supplying JSC Baltika Breweries with raw materials reduced	<p>1) Benchmarking system for agro-industrial suppliers in 5-6 locations established and technical assistance provided to these suppliers to identify and reduce their water and energy foot print</p> <p>2) TA assistance to agro-industries along the supply chain to reduce over fertilization and reduce N and PH inputs into ground and surface water bodies by developing of a rapid analysis methodology for determination of available nitrogen in Russian soils on the basis of infrared spectrometry at representative demonstration sites, by monitoring of nitrogen migration to groundwater by the use of lysimeters at 2 demonstration farms and by providing TA for optimal N and PH fertilizer application for agro-industrial suppliers</p> <p>3) TA incl field seminars and trainings for agricultural producers for the development of new</p>	GEFTF	1,800,000	5,400,000

			agricultural technologies for the use of new drought resistant plant varieties			
4) Development of innovative non - commercial brewery waste to energy approaches	Inv	Climate change impact of potential GHG emissions from currently non regulated brewery waste mitigated/avoided	1) Testing, implementation of pilots in 2 Baltika breweries and standardization of innovative waste to energy methodologies based on the use of “spent grain” and other brewery waste products in aerobic digesters or combined heat and power plants (exclusive focus will be on technologies which are not yet economically feasible under present energy price regime)	GEFTF	1,020,000	8,580,000
5) Development of economic instruments and contribution to the development of regional, national and international policies promoting to mainstream the application of resource efficient cleaner production principles	TA	National, international and regional policies and suitable economic instruments provide incentives for resource efficient cleaner production and GHG reductions in brewery processes and the related supply chain	1) lessons learned from the implementation of pilots disseminated at regional and national level and used for the development of economic instruments and regional/national policies 2) draft/model economic instruments designed to incentivize the sector and its supply chain to reduce pollution, reduce ghg emissions and optimize water and resource utilization 3) Draft/model national policies, legislation institutional reforms which promote and mainstream application of cleaner and resource efficient production principles in the sector and its supply chain developed 4) Results achieved disseminated and up-scaled at national and global level through	GEFTF	780,000	2,100.000

			cooperation with national (Union of Russian Brewers) and international beverage associations (Beverage Industry Environment Roundtable -BIER)			
6) Civil society engagement	TA	Regional ownership and anchoring strengthened and broad based civil society participation ensured	Awareness creation activities implemented by CSOs with regards to water and energy use/savings and environmental pollution in municipalities in the proximity of Baltika breweries	GEFTF	300,000	930,000
	(select)			(select)		
	(select)			(select)		
	(select)			(select)		
Subtotal					6,000,000	29,510,000
Project Management Cost (PMC) <sup>4</sup>				GEFTF	300,000	1,350,000
Total Project Cost					6,300,000	30,860,000

**C. INDICATIVE CO-FINANCING FOR THE PROJECT BY SOURCE AND BY NAME IF AVAILABLE, (\$)**

Sources of Cofinancing	Name of Cofinancier	Type of Cofinancing	Amount (\$)
Private Sector	Baltika Breweries	Grant	30,000,000
National Government	Ministry of Natural Resources and Environment	In-kind	800,000
GEF Agency	UNIDO	Grant	60,000
(select)		(select)	
(select)		(select)	
(select)		(select)	
<b>Total Cofinancing</b>			<b>30,860,000</b>

**D. INDICATIVE TRUST FUND RESOURCES (\$) REQUESTED BY AGENCY, FOCAL AREA AND COUNTRY<sup>1</sup>**

GEF Agency	Type of Trust Fund	Focal Area	Country Name/Global	Grant Amount (\$) (a)	Agency Fee (\$) (b) <sup>2</sup>	Total (\$) c=a+b
UNIDO	GEFTF	International Waters	Global	2,800,000	266,000	3,066,000
UNIDO	GEFTF	Climate Change	Russian Federation	2,000,000	190,000	2,190,000
UNIDO	GEFTF	Land Degradation	Russian Federation	1,500,000	142,500	1,642,500
(select)	(select)	(select)				0
(select)	(select)	(select)				0
<b>Total Grant Resources</b>				<b>6,300,000</b>	<b>598,500</b>	<b>6,898,500</b>

<sup>1</sup> In case of a single focal area, single country, single GEF Agency project, and single trust fund project, no need to provide information for this table. PMC amount from Table B should be included proportionately to the focal area amount in this table.

<sup>2</sup> Indicate fees related to this project.

<sup>4</sup> To be calculated as percent of subtotal.

**E. PROJECT PREPARATION GRANT (PPG)<sup>5</sup>**

Please check on the appropriate box for PPG as needed for the project according to the GEF Project Grant:

	<u>Amount Requested (\$)</u>	<u>Agency Fee for PPG (\$)<sup>6</sup></u>
• No PPG required.	-- 0--	--0--
• (upto) \$50k for projects up to & including \$1 million	_____	_____
• (upto)\$100k for projects up to & including \$3 million	_____	_____
• (upto)\$150k for projects up to & including \$6 million	90,000	8,550
• (upto)\$200k for projects up to & including \$10 million	_____	_____
• (upto)\$300k for projects above \$10 million	_____	_____

**PPG AMOUNT REQUESTED BY AGENCY(IES), FOCAL AREA(S) AND COUNTRY(IES) FOR MFA AND/OR MTF PROJECT ONLY**

Trust Fund	GEF Agency	Focal Area	Country Name/ Global	(in \$)		
				PPG (a)	Agency Fee (b)	Total c = a + b
GEF TF	UNIDO	International Waters	Global	35,000	3,325	38,325
GEF TF	UNIDO	Climate Change	Russian Federation	30,000	2,850	32,850
GEF TF	UNIDO	Land Degradation	Russian Federation	25,000	2,375	27,375
<b>Total PPG Amount</b>				<b>90,000</b>	<b>8,550</b>	<b>98,550</b>

MFA: Multi-focal area projects; MTF: Multi-Trust Fund projects.

<sup>5</sup> On an exceptional basis, PPG amount may differ upon detailed discussion and justification with the GEFSEC.

<sup>6</sup> PPG fee percentage follows the percentage of the GEF Project Grant amount requested.

## **PART II: PROJECT JUSTIFICATION<sup>7</sup>**

### **A. PROJECT OVERVIEW**

**A.1. Project Description.** Briefly describe the project, including ; 1) the global environmental problems, root causes and barriers that need to be addressed; 2) the baseline scenario and any associated baseline projects, 3) the proposed alternative scenario, with a brief description of expected outcomes and components of the project, 4) incremental cost reasoning and expected contributions from the baseline , the GEFTF, LDCF/SCCF and co-financing; 5) global environmental benefits (GEFTF, NPIF) and adaptation benefits (LDCF/SCCF); 6) innovativeness, sustainability and potential for scaling up

Inefficient brewing processes can have a very large environmental footprint as significant quantities of water and land areas are used in both the agricultural industries that provide vital ingredients (barley, rice, etc.) and at the breweries themselves in the beer production processes. Brewery processes are also relatively intensive users of both electrical and thermal energy.

The objective of this FSP is to demonstrate a replicable approach how Baltika Breweries as a corporate socially responsible industrial player with technical assistance by UNIDO can become a steward in a public private partnership to pro-actively reduce direct and indirect brewery related environmental stress and promote sustainable management of natural resources along the entire supply chain in those regions of the Russian Federation where the Baltika Breweries and its agro-industrial suppliers operate.

Building on a significant private sector investment initiative – over the next five years Baltika Breweries will invest US\$ 30 mio in resource efficient cleaner production and pollution reduction into the eleven breweries operated in the territory of the Russian Federation that will minimize Baltika’s direct environmental impact in the brewing process, the public private partnership will aim at reducing the indirect environmental impact Baltika has through its agro-industrial suppliers and enhance institutional capacities for sustainable natural resource management and GHG emission mitigation.

Under the public private partnership Baltika will become a steward for the strengthening of institutional capacities for sustainable water management , proactive investments in infrastructure for communal waste water treatment and brewery waste water treatment beyond regulatory requirements, replenishment of depleted ground water resources, restoration of water body ecosystem services, the reduction of the environmental footprint of agro-industrial suppliers, for the transformation of innovative so far commercially not yet viable brewery waste to energy approaches to reduce GHG-emissions, for the development of economic and regulatory instruments to mainstream resource efficient cleaner production and the involvement of Civil Society Organizations in community based water and energy saving initiatives.

#### **1) global environmental root causes and barriers that need to be addressed:**

Surface and ground water resources in the Russian Federation are exposed to increasing stress from over-extraction for multiple uses, pollution from point and non point sources as well as loss of critical aquatic habitats. Arable land is exposed to increasing environmental pressures resulting from intensive agricultural production with the over application of fertilizers and agrochemicals, destruction of soil structure, loss of organic matter, erosion, soil degradation often resulting in the long term loss of soil fertility. This has resulted in substantive detrimental environmental impacts on downstream transboundary surface and groundwater bodies as well as LMEs. The use of outdated and energy inefficient equipment and production methods in breweries and by agro-industrial suppliers results in disproportionate GHG emissions. While demand for agricultural outputs that has to be produced using a limited supply of water and arable land is still growing the effects of climate change do already contribute to further exacerbate environmental pressures on water and land resources in the Russian Federation. These stresses must be expected to further increase in the near future.

Many Russian breweries still employ outdated energy intensive, sometimes overdimensioned and often poorly maintained equipment (steam boilers, refrigeration and cooling facilities, engines, compressors etc.), occur massive losses in poorly insulated heat and steam transmission systems, are not equipped with heat recovery systems, are dependent on carbon intensive form of energy supply (coal or oil based) and do lack state of the art waste to energy facilities. While water and energy prices in the Russian Federation vary widely from Republic to Republic and while a general trend in price increases can be observed, they are generally still too low to provide the economic incentives to trigger a change towards more resource efficient cleaner production processes. Under the prevailing price regime many

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<sup>7</sup> Part II should not be longer than 5 pages.

innovative waste to energy approaches are economically not viable.

Compared with best international practice there are still significant opportunities to improve Russian agricultural standards and practices in order to minimize the impact of agriculture and over-fertilization on climate change, land degradation, water body eutrophication and biodiversity loss. E.g. there is no control on nitrogen and phosphorous fertilizers application though these fertilizers are the main pollutants of local and international water bodies, including ground waters. In most regions analyses of nitrogen content in soils and ground water have not carried out for more than 10 years. The situation in the Russian Federation is characterized by a lack of standardized analyzing methodologies as well as by a lack of analytical equipment and poor extension services. Market prices for fertilizer are regulated and fail to send the right signals to consumers to optimize the application of fertilizer in line with actual crops needs.

Regional institutions for water and land resource management lack the institutional capacities for the development of regulatory and economic instruments necessary to mainstream resource efficient cleaner agricultural production and brewing processes.

In the absence of these instruments the brewery sector and its agro-industrial suppliers lack incentives to switch to more resource efficient cleaner production methods.

## **2) baseline scenario and associated baseline projects**

Since 2012 Baltika Breweries are owned to 100% by the Carlsberg Group. As a major player in the global brewery industry and a major water user in the developing world, the Group has committed to substantially reducing its direct and indirect water and energy footprint and to enhance its engagement with local stakeholders. In further support of these objectives, Carlsberg in 2008 joined the Beverage Industry Environmental Roundtable (BIER) and joined the UN Global Compact including signature (in 2009) of the CEO Water Mandate.

In 2011, the Group continued the implementation of a Group-wide Lean Utilities programme to reduce energy and water consumption in its breweries and subsidiary companies. This led to significant improvements in the group's water and energy efficiency, particularly as a result of the strong performance of the Baltika Breweries production sites. The results showed that there is still a high potential for further improvements in water and energy efficiency in the breweries operated by Baltika and that there is a significant potential to reduce environmental impacts of the agro-industries operating along the supply chain for the breweries operated by Baltika in the Russian Federation.

Building up on significant investments made over the previous years Baltika Breweries will invest US\$ 30 mio over the next five years in measures to further increase the water and energy efficiency of its breweries in the Russian Federation and to make them fully compliant with waste water effluent standards. This investment will assure that environmental impacts and resource consumption directly related to Baltika's core business – the brewing of beer in its 11 breweries - will be minimized and that the extension services to agro-industries for quality assurance of the various factor inputs in Baltika's production process (mainly high quality brewing barley in line with Baltika's requirements) can be improved.

In the United Nations Communication on progress in implementation of the UN compact and its Corporate Social Responsibility Policy the Carlsberg Group has set the following corporation wide targets to be achieved by 2015:

Energy and emissions:

- Specific Energy Consumption: 29 kWh/hl (2010: 32,3 kWh/hl, 2011: 29,2 kWh/hl)
- Specific CO<sub>2</sub> emissions: 7,5 kg CO<sub>2</sub>/hl (2010: 8,6 kg CO<sub>2</sub>/hl, 2011: 7,9 kg CO<sub>2</sub>/hl )

Water:

- Specific water consumption: 3,2 hl/hl (2010: 3,5 hl/hl, 2011: 3,3 hl/hl)
- Long-term strategic approach to water risk management in place
- New technologies for re-use of water inside and outside our breweries explored

For Baltika Breweries with an annual production in 2012 of 37,2 mio hl this translates into the following reductions in water and energy consumption and related CO<sub>2</sub> emissions to be achieved by 2015:

- 7,44 GWh reductions in energy consumption
- 14,880 t CO<sub>2</sub> emission reductions

- 372,000 m<sup>3</sup> reductions in water consumption

### 3) proposed alternative scenario, expected outcomes and components of the project

As the market leader in the Russian Federation Baltika Breweries is a major natural resource user and a key stakeholder in catchment areas that have come under increased environmental stress due to the overuse of water resources for multiple purposes and due to unsustainable land use patterns. Going beyond the goals stipulated in the the exemplary CSR policy of its parent company the Carlsberg Group, Baltika Breweries has committed not only to minimize the direct environmental footprint of its brewing processes but also to become proactively engaged as a steward for the sustainable use and management of natural resources and climate change mitigation in catchment areas in which Baltika directly through its breweries or indirectly through its agro-industrial suppliers is a major stakeholder. Through this public private partnership investments in institutions and infrastructure for water resource protection, conservation and sustainable water and land management and climate change mitigation measures will be effected in those regions exposed to multiple environmental stress in which Baltika and its suppliers are a main natural resource user. For this purpose the scope of the extension services provided by Baltika to its suppliers will be significantly broadened under the proposed public private partnership from a previously exclusively quality oriented extension service to an extension service which aims at supporting the agro-industrial suppliers to apply resource efficient cleaner production processes with the overall objective to reduce their environmental footprint and consequently to reduce the environmental footprint per unit output produced by Baltika's breweries applying a comprehensive cradle to grave approach.

While Baltika will dedicate \$ 30 mio over the next to make its breweries more water and energy efficient as well as fully compliant with effluent standards for brewery waste water to minimize the direct environmental impacts from brewing processes, Baltika -building up on the extension services rendered to its agro-industrial suppliers - will become pro-actively engaged through the proposed public private partnership in efforts aiming at the reduction of the environmental footprint of agro-industries along the supply chain of Baltika breweries, in investments to free water resources currently used by its breweries for other uses, restoring the ecological functionality of water bodies, mitigating the impact of its breweries on climate change by testing innovative waste to energy approaches and in the strengthening of public sector capacities for sustainable natural resource management.

While Baltika will focus on improving the efficiency of its facilities support provided through the GEF will focus on activities to be supported under the public private partnership to make agro-industrial industries along the supply chain more water and energy efficient and the provision of technical assistance to public sector institutions for sustainable natural resource management.

Overall incremental GHG emissions to be achieved by the project can be estimated to be in the range of 43.000 t CO<sub>2</sub> equivalents per year. This is likely to be an underestimation. A detailed assessment will be carried out during the PPG phase.

Sustainability will be achieved by disseminating the results to other industries in the sector through industry associations and by creating the regulatory framework including economic incentives required for the mainstreaming of resource efficient cleaner production processes in breweries their agro-industrial supply chain.

As the main outcome of **component (1) “Public Private Partnerships with institutions for water resource management”** the institutional capacities of public institutions for the sustainable management of increasingly scarce water resources will be strengthened in 5-6 regions. In close cooperation with public institutions a lifecycle assessment methodology to measure the environmental footprint of breweries including its supply chain based on the cradle to grave methodology will be developed so that further footprint reduction potentials can be identified and realized. In this process at least 180 decision makers in public institutions will be trained in the application of this methodology. Local governments and regional institutions for water resource management will be assisted in and their institutional capacities will be strengthened in the assessment and modeling of water resources for the sustainable conjunctive use of surface and groundwater. This will form the basis for joint public-private local community integrated watershed management programmes that will be developed and implemented.

As the main outcome of component (2) **“Proactive investments in infrastructure for waste water treatment, ground water replenishment and water body restoration”** stress on water resources will be reduced, water quality will be improved, ecosystem services will be enhanced and water resources previously used by Baltika will become

available to other users. Stress reduction will be achieved by treating brewery waste water beyond the regulatory requirements for brewery effluents so that it can be re-used for the replenishment of depleted aquifers and by developing appropriate waste water treatment processes for brewery effluents so that the treated waste water can be re-used for water efficient and nutrient recycling drip irrigation. Using the figures for Chelyabinks and the Samara breweries with an annual waste water production of 961,023 m<sup>3</sup>/yr and 915,936 m<sup>3</sup>/yr and assuming that 75% of the water can be used after the additional treatment for groundwater replenishment and drip irrigation, this will make 1,407,719 m<sup>3</sup> per year of previously unused waste water available for ground water replenishment and community based drip irrigation in semi-arid regions.

To preserve water resources waste water treatment capacities in a community upstream of Baltika breweries will be improved by the establishment of intermittent vertical flow constructed wetlands for BOD removal. Assuming that the pilot plant will be able to treat the domestic waste water of some 2.000 inhabitants and using an average BOD<sub>5</sub> load of 60 g per person and day, the annual water body stress reduction to be achieved by the constructed wetland can be estimated with 43,8 t BOD<sub>5</sub> per year. To treat the wastewater of 2.000 inhabitants will require the installation of constructed wetlands with a surface of 8.000 m<sup>2</sup>. While the direct carbon sequestration of these constructed wetlands with a surface of 0,8 ha will only amount to 2,6 t CO<sub>2</sub> equivalent per year<sup>8</sup> the treatment of the same amount of wastewater with a conventional wastewater treatment plant (sequencing batch reactor) would require an energy input of 40-50 kWh per capita and year. Assuming an average carbon intensity of 73.6 kg CO<sub>2</sub> emitted per GJ produced, the emissions avoided by treating the wastewater by constructed wetlands rather than by a conventional waste water treatment plant can be estimated to be 23,8 t of CO<sub>2</sub> per year.

To enhance ecosystem services and self purification capacities of surface water bodies previously drained wetlands and autochthon riparian vegetation will be restored along water bodies to reduce organic pollution loads. While the restoration of previously drained wetlands in comparable climatic conditions has resulted in a positive net GHG balance of 3.25 t CO<sub>2</sub> equivalent per ha and year<sup>8</sup> the restoration of autochthon riparian vegetation will result in a reduction of BOD<sub>5</sub> load of 7,9 t per ha and year<sup>9</sup>.

As the main outcome of **component (3) “Reduction of environmental footprint of agri industries along the supply chain of Baltika breweries”** the environmental pressure on competing land uses exerted by agro-industrial industries supplying Baltika breweries with raw materials will be reduced. For this purpose a benchmarking system for agri-industrial suppliers will be established based on the principles enshrined in ISO 50001 in 5-6 locations and technical assistance will be provided to these suppliers to identify cost efficient potentials to reduce their water and energy footprint. TA will be provided to agri-industries along the supply chain to reduce over fertilization and reduce N and PH inputs into ground and surface water bodies by developing a rapid analysis methodology for determination of available nitrogen in Russian soils on the basis of infrared spectrometry at representative demonstration sites, by monitoring of nitrogen migration to groundwater by the use of lysimeters at 2 demonstration farms and by providing TA for optimal N and PH fertilizer application for agro-industrial suppliers. TA including field seminars and trainings for agricultural producers for the development of new agricultural technologies for the use of new drought resistant plant varieties will be provided.

Presently the agro-industrial suppliers providing the raw materials for Baltika breweries manage an area of approximately 160.000 ha. TA assistance for the establishment of the benchmarking system and for the reduction of N and PH over-fertilization will reach some 60% of the agro-industrial suppliers so that some 96.000 ha of agricultural land will be managed in a more sustainable with fertilizer application optimized in line with the actual plant uptake capacity. Presently agro-industrial suppliers apply in average 55 kg N and 40 kg of PH fertilizer per ha. Under the FSP this will be reduced by at least 5% each. This will result in an annual saving in N fertilizer application of 264.000 kg/yr and in PH fertilizer application by 192.000 kg/yr.

While the GHG emission reductions from reduced N<sub>2</sub>O emissions as a result of reduced N fertilizer application are contingent to a series of factors (fertilizer type, timing, placement and rate) which will be assessed during the PPG phase, the reductions in energy consumption for the production of synthetic fertilizer resulting from the avoided over

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<sup>8</sup> Badiou, P., C. Edwards, M. Gloutney (2010) TEEBcase: Wetland restoration for carbon sequestration in Prairie Canada, available at: TEEBweb.org.

<sup>9</sup> Euro Mediterranean Information System on know-how in the water sector, WEST project (2006)

application of N fertilizer alone can be estimated to be 44 GJ/t N fertilizer<sup>10</sup>. With an average carbon intensity of 73,6kg CO<sub>2</sub> emissions per GJ energy produced, this is equivalent to an annual reduction in CO<sub>2</sub> emissions of 854 t.

The direct emissions from nitrogen fertilization in t CO<sub>2</sub>-e per year can be estimated by using the UNFCCC A/R methodological tool<sup>11</sup> as follows:

$$N_2O_{\text{direct-N,t}} = (F_{\text{SN,t}} + F_{\text{ON,t}}) * EF_1 * MW_{\text{N}_2\text{O}} * GWP_{\text{N}_2\text{O}}$$

Without distinguishing between synthetic ( $F_{\text{SN,t}}$ ) and organic fertilizer ( $F_{\text{ON,t}}$ ), as noted in the IPCC 2006 Guidelines (table 11.1), the default emission factor ( $EF_1$ ) is 1 % of applied N,  $MW_{\text{N}_2\text{O}}$  the ratio of molecular weights of N<sub>2</sub>O and N (44/28) and the IPCC default value of 310 as global warming potential for N<sub>2</sub>O ( $GWP_{\text{N}_2\text{O}}$ ) this will result in a reduction in GHG emissions of 1,286 t CO<sub>2</sub>-e per year.

At the location of the 2 lysimeters actual N<sub>2</sub>O emissions from soil will be measured using small flux chambers, the gas being determined by gas chromatography with an electron capture detector. Baltika will continue to provide support for the operation of the lysimeters and the N<sub>2</sub>O emission monitoring program beyond the project implementation period.

As the main outcome of component (4) **“Development of innovative non-commercial brewery waste to energy approaches”** climate change impact of currently non regulated brewery waste will be mitigated. This will be achieved by developing innovative concepts, the implementation of pilots adapted to the local conditions in at least 2 Baltika breweries and standardization of innovative waste to energy methodologies based on the use of “spent grain” and other brewery waste products. During the PPG phase a detailed feasibility study will be carried out to determine whether taking the overall CO<sub>2</sub> balance into consideration biogas production through anaerobic digestion or using spent grain in combined heat and power plants is the most economic and best appropriate approach resulting in a maximum mitigation of CO<sub>2</sub> emissions. Under this component the exclusive focus will be on innovative technologies to use brewery waste for energy generation which are not yet economically feasible under present energy prices but will only become feasible under higher energy prices which are to be expected in the future. This will result in substantive GHG emission reductions. The energy content (H) of spent grain varies considerably with the moisture content (w) and the value can be calculated with the following equation<sup>12</sup>:

$$H = [1/4(1-w) * 21000] - (w * 2250)$$

The wet spent grain typically leaves the brewing process with 80% moisture content and this must be dried before it can be effectively burnt in a biomass boiler. The water content of the spent grain must be reduced to below 58% for to make it an effective fuel and the most energy efficient way to do this was found to be through the use of a belt press which squeezes the water out of the grain. At 58% moisture content the mass of spent grain has a calorific value of 7.5 GJ/t.

With Yaroslavl brewery producing 71.300 t and Rostov brewery producing 42.500 t of spent grain per year, out of which only 15% can be sold as cattle feed the total amount of spent grain available for the waste to energy projects in these two breweries amounts to 96.730 t/y. At 58% moisture content this corresponds to a potential energy content of 725.475 GJ/y. With an energy transformation efficiency of 75% and an average carbon intensity (for gas, oil and coal) of 73.6 kg CO<sub>2</sub> emitted per GJ produced the CO<sub>2</sub> reduction potential of using the spent grain in a fuel switch can be roughly estimated to be 40.046 t/year of CO<sub>2</sub> emissions avoided. The feasibility study to be carried out during the PPG phase will also identify the most energy efficient way to reduce the water content of spent grain based on a system analysis of the breweries where these innovative technologies will be applied and assessing the possibility for the use of other alternative energy sources for this purpose.

As the main outcome of component (5) **“Development of economic instruments and development of regional, national and international policies promoting to mainstream the application of resource efficient cleaner production principles”** national and regional policies and suitable economic instruments to provide incentives for resource efficient cleaner production and GHG reductions in brewery processes and their agro-industrial supply chain will be developed. Lessons learned from the implementation of pilots will be disseminated at regional and national level and used for the development of economic instruments and regional/national policies. Draft/model economic instruments designed to incentivize the sector and its supply chain to reduce pollution, reduce ghg emissions and optimize water and resource utilization will be developed. In order to create the regulatory framework to promote and mainstream the application of cleaner and resource efficient production principles in the sector and its supply chain

<sup>10</sup> Yara International ASA, Important questions on fertiliser and the environment

<sup>11</sup> UNFCCC EB 33 Report Annex 16

<sup>12</sup> University of Strathclyde, “Towards a Net Zero Carbon Community”

draft/model the development of drafts for necessary national policies, legislation and institutional reforms will be supported. This component will be implemented in close cooperation with national and international industry associations to achieve synergies and leverage broad scale sector wide private sector participation and upscaling at national and global level. While the Union of Russian Brewers will be the main partner at national level, the Beverage Industry Environmental Roundtable will become the main partner at international level.

As the outcome of **component (6) “Civil society engagement”** regional ownership and anchoring of the public private initiative in the civil society will be strengthened and broad based civil society participation will be ensured. For this purpose awareness creation activities implemented by CSOs with regards to water and energy use/savings and environmental pollution reduction in municipalities in the proximity of Baltika breweries will be supported.

#### **4) incremental cost reasoning and contributions from the baseline**

The objectives of the incremental activities proposed under this FSP are building upon the US\$ 30 mio investment programme Baltika will realize over the next five years to make its breweries more water and energy efficient as well as fully compliant with effluent regulations for brewery waste water. While Baltika’s private sector investment will further reduce the group’s direct environmental impact linked to its core business, the incremental activities will enable the public private partnership to become pro-actively engaged in reducing the indirect environmental impacts of Baltika’s agri-industrial suppliers, in reducing water body pollution by other users, in investing into commercially not yet viable waste to energy methodologies and in providing technical assistance for the development of regulatory and economic instruments for sustainable land and water resources management and the mainstreaming of resource efficient cleaner agricultural production and brewery processes.

The principle of incrementality of this FSP stems from the areas set out hereinafter linked to the GEF focal area strategies for International Waters, Climate Change and Land Degradation:

1. The direct reduction of pollution, water use stress on a range of transboundary water bodies, greenhouse gas emissions and land degradation through the application of cleaner brewery and agricultural production technologies, the application of sustainable and nutrient efficient land use practices as well as the application of waste to energy processes in the breweries and their associated agro industries along the supply chain.

2. An improvement in the Russian Federation’s governance framework and the economic framework will be achieved through the identification and reform of policies, legislation and economic instruments that aim to provide economic, financial and other incentives for breweries, agro industrial suppliers and other beverage industries to optimize efficiency in water and energy use, the application of sustainable land management practices as well as the minimization of pollutants released to the environment.

#### **5) global environmental benefits**

The project will deliver global environmental benefits through reducing pollution, reducing water consumption, reducing green house gas emissions, reducing fertilizer inputs, reducing land degradation, implementing integrated approaches to soil fertility and water management, improving soil health, improved provision of agro-ecosystem goods and services and improving the flow regimes of transboundary water systems within which the Baltika breweries are located. It will deliver MDG benefits through improving environmental sustainability, reducing the brewery and its agro-industrial supply industry’s contribution to greenhouse gas emissions and land degradation, increasing local access to clean water, basic sanitation, and maintaining aquatic and terrestrial ecosystem services. Additionally, by establishing innovative brewery waste to energy system, the FSP will contribute to a reduction of CO2 emissions per unit of output and thereby positively contribute to mitigate the impacts of climate change. Detailed quantitative assessment of the expected global environmental benefits will be conducted during the PPG and prepared as part of the CEO Endorsement Request.

#### **6) Innovativeness, sustainability and potential for scaling-up**

The proposed approach under which a profit oriented private sector company does not only invest in reducing the direct environmental impacts but does also become pro-actively engaged as a steward in a public private partnership to facilitate water and energy conservation measures, pollution reduction of upstream water users, maintaining and restoring terrestrial and aquatic ecosystem services in transboundary water systems, development of economically not yet feasible waste to energy approaches for GHG emission reduction and the provision of technical assistance to regional land and water management institutions for the development of regulatory and economic instruments to mainstream pollution reduction through resource efficient cleaner production is so far unprecedented in the Russian

Federation.

At the institutional level sustainability and potential for scaling up will be achieved through the development of regulatory and financial instruments which provide push and pull factors to mainstream resource efficient cleaner production in breweries and along the agro-industrial supply chain. With the development of appropriate economic instruments the mainstream application of innovative brewery waste to energy processes will become economically feasible and in combination with a sector wide dissemination of the results achieved will create the potential for country wide up-scaling by other breweries.

In discussions pertaining to the preparation of this FSP it was agreed with Baltika's management that all information on any of the the results achieved with funds provided by the GEF will become public domain. Upscaling at national and international level will be actively pursued through dialogue, sharing of experience and involvement of beverage industry associations and roundtables like the Union of Russian Brewers and the Beverage Industry Environmental Roundtable (BIER).

**A.2. Stakeholders. Identify key stakeholders (including civil society organizations, indigenous people, gender groups, and others as relevant) and describe how they will be engaged in project preparation:**

The main stakeholders will be the targeted breweries, national and regional institutions for water resource management, communities living in proximity to Baltika breweries, CSOs active in the fields of water and energy efficiency and agro-industries along the supply chain. They will become the primary beneficiaries of the investments, trainings and recommendations on sustainable land management practices and water and energy efficiency improvements. The communities living in the vicinity of these companies will also benefit from direct interventions as well as indirectly as their water, energy and raw material resources will be used in a more sustainable manner. By reducing the breweries' and their suppliers' water and energy consumption, pollution and land use impacts, these resources will remain and/or become available for other uses and productive activities. Some corporate agro-industrial partners of Baltika Breweries will not only be beneficiaries of technical assistance provided but also become investors in cost efficient water and energy and land use management improvements that will be identified in the benchmarking and footprint process. .

Representatives of national and local governments, regulatory and norm setting bodies constitute the second major group of stakeholders for the proposed FSP. They will equally become involved in trainings aiming at strengthening their institutional capacities for the development of regulatory and economic instruments. Establishing a close cooperation with the private sector will entitle these institution to improve and develop an efficient and effective governance framework which is the pre-requisition for environmentally, socially and economically sustainable private sector operations in the breweries sector including their agro-industrial suppliers.

**A.3 Risk. Indicate risks, including climate change, potential social and environmental risks that might prevent the project objectives from being achieved, and, if possible, propose measures that address these risks to be further developed during the project design (table format acceptable):**

<b>Possible risk</b>	<b>Mitigation Measures</b>	<b>Rating</b>
Low engagement of agro-industrial suppliers and slow implementation /take up of cost effective water, fertilizer and energy saving potentials identified	JSC Baltika Breweries has a well established extension service network. In cooperation with regional institutions this network will be used for the establishment of a benchmarking system through which the cost saving potential of water, fertilizer and energy reductions in agricultural production will be disseminated. Results from the demonstration farms showing that optimal plant available soil N and PH can be achieved with lower fertilizer application will be disseminated	Low
Climate change related risk	Impacts of climate change and in particular of extreme weather events might have impacts on the overall sustainability of agro-industrial production of brewery raw materials. This risk will be mitigated through TA including field seminars and trainings	Low over project implementation period but with the potential to grow significant

	for agro-industrial producers for the development of new agricultural technologies for the use of new drought resistant plant varieties	over mid term period
Low engagement of public institutions for integrated land and water resource management	The proposed project has been discussed with JSC Baltika Breweries with key institutions in several catchment areas. They have shown a high interest. This high interest will be maintained by actively involving these institutions in project design during the PPG phase and in project implementation to assure strong ownership and identification with the project' s goals.	Low
Regulatory and economic instruments might not be ratified by legislative bodies during project implementation period	Government institutions at Federal and Republic level will already be integrated during the PPG phase in the preparation of feasibility studies to identify the most economic innovative brewery waste to energy technology and on regulatory/economic instruments required to make these technologies as well as water and energy efficient production processes along the agro-industrial supply chain economically feasible. Awareness creation activities for regulatory and legislative bodies will be launched right from the beginning of project implementation to expose decision makers with best practice from other countries. Together with data gained during the implementation of the pilots this will be used in the further process to develop regulatory and economic instruments. In its own interests – only suitable economic instruments make innovative waste to energy approached economically feasible – Baltika will continue pursuing this goal beyond project implementation period with support by the Centre and for International Industrial Cooperation in the Russian Federation	Low-medium

**A.4. Coordination. Outline the coordination with other relevant GEF financed and other initiatives:**

Many of the Baltika breweries and associated supply industries communities subject to the proposed FSP interventions lie in transboundary water bodies, both surface and groundwater. Efforts will therefore be made to coordinate FSP activities with relevant GEF IW projects which are working on similar issues pertinent to nutrient over-enrichment and conflicting water uses in these same water bodies.

Implementation of the FSP will be coordinated with the project “Identification, evaluation and prioritization of pollution “hot-spots” in the basins of trans-border reservoirs and Transfer of Environmentally sound Technologies UNIDO is implementing at present with funds provide by the Russian Federation’s Industrial Development Funds.

The proposed FSP is fully aligned with and complementary to the planned GEF/UNIDO Project Low Carbon Technology Transfer in the Russian Federation which will be implemented at the federal level with the goal to reduce greenhouse gas emissions in the Russian Federation by increasing and accelerating the transfer, deployment and development of low-carbon technologies through the establishment of a supportive policy and institutional framework and through pilot investments in manufacturing capacity and increased financing for these technologies. While this project will mainly operate at the federal level and across all industries operating in the manufacturing sector synergies will be created with the proposed FSP by integrating brwery sector specific requirements into the overall development of a supportive policy and institutional framework. Economies of scale will be achieved by closely coordinating all activities to be implemented under this FSP aiming at the development of regulatory and economic instruments with the planned GEF/UNIDO Low Carbon Technology Transfer in the Russian Federation.

The proposed FSP is fully aligned with the goals of the unprecedented Chistaya Voda (Clean Water) project, funded by the Russian Government, which aims amongst other at changes in legislation to help protect water resources. At the initial stage, the total cost of this project, (which is scheduled for completion by 2025), was estimated at 15 trillion rubles (USD \$576 billion). While this new project is multifaceted and involves the upgrade of water supply and sewage systems in Russia, changes in legislation to help protect water resources he proposed FSP will be complementary by supporting the protection and the sustainable management of water resources in those regions where Baltika and its agro-industrial suppliers are major stakeholders. While Chistaya Voda mainly targets large scale water and sewage infrastructure the proposed MSP will complement this by supporting the implementation of cost effective investments at the level of smaller communities.

In support of the objective of knowledge dissemination towards broader industry transformation project implementation will be coordinated with other efforts aimed at enhancing corporate water, land and energy responsibility in the brewery and beverage sector, such as the Union of Russian Brewers, the Worldwide Brewing Alliance, the CEO Water Mandate, the Beverage Industry Environmental Roundtable (BIER) and others.

## **B. DESCRIPTION OF THE CONSISTENCY OF THE PROJECT WITH:**

### **B.1 National strategies and plans or reports and assessments under relevant conventions, if applicable, i.e. NAPAS, NAPs, NBSAPs, national communications, TNAs, NCSAs, NIPs, PRSPs, NPFE, Biennial Update Reports, etc.:**

The proposed FSP is fully aligned with the 2002 Environmental Doctrine of the Russian Federation, which identifies the following priorities in the field of environmental protection:

- a) Sustainable use of (renewable and non-renewable) natural resources.
- b) Reduction of pollution and sustainable use of resources.
- c) Conservation of biodiversity.
- d) Improvement of the quality of life and public health by improving environmental quality.

The proposed FSP is also highly consistent with the commitments of the Russian Federation as an Annex 1 member of the United Nations Framework Convention on Climate Change, and it reflects national priorities that are expressed in Russia's policies and legislation on energy, climate change mitigation, economic development, and innovation in science and technology.

The proposed FSP is fully in line with the the Russian Federation's Energy Strategy to 2020, the Climate Change Doctrine for the period until 2020, adopted in 2009 (CDRF 2009), the Comprehensive Plan of Implementing the Russian Federation's Climate Doctrine for the Period until 2020", introduced by a government decree of April 25, 2011 and the 5<sup>th</sup> National Communication of the Russian Federation . CDRF 2009 as the overarching policy document based on the principles enshrined in the Convention envisages the development of a legal framework and the development of economic tools aimed at promotion of climate change related programmes. In the 5<sup>th</sup> Communication the promotion of energy efficiency which was long overlooked owing to a lack of economic incentives to save abundant and cheap energy resources was set a top priority. The project also contributes to mitigate GHG emissions from the agricultural sector, which are reported in the 5<sup>th</sup> Communication as the 3<sup>rd</sup> important source of GHG emissions of strategic importance in the Russian Federation and which have been observed to be on the raise since 2006.

The proposed FSP is fully aligned with the Energy Strategy document of the Russian Federation, which sets out the policy for the period up to 2020. In 2000 the Russian government approved the main provisions of the Russian Energy Strategy to 2020, and in 2003 the new Russian Energy Strategy was confirmed by the government. The Energy Strategy document outlines several main priorities: an increase in energy efficiency, reducing industrial impact on the environment, sustainable development, energy development and technological development, as well as improved effectiveness and competitiveness.

The FSP is also fully aligned with "The Concept for long-term Socioeconomic Development of the Russian Federation", which the Ministry of Economic Development and Trade published in 2007, and which has established energy efficiency and a rational model of resource consumption as the first of five strategic directions for the modernization of the Russian economy.

The FSP is furthermore in line with the objectives of the Russian Federation's targeted Programme "Environmental Safety", which was launched in 2011 and will be fully implemented throughout 2012 and 2013.

The proposed FSP is furthermore fully aligned with the Russian Agricultural Development Aid Cooperation Initiative (ADAC), which aims at enhancing environmental sustainability of agricultural production in particular in response to climate change. Russia has allocated US\$ 22.5 for the implementation of ADAC for the period 2012-2014.

#### **B.2. GEF focal area and/or fund(s) strategies, eligibility criteria and priorities:**

The subject FSP is the result of long term discussions between the JSC Baltika Breweries and UNIDO, on the development of a public private partnership to fully integrate corporate social responsibility beyond the value chain in breweries managed by JSC Baltika Breweries. With the overall objective of this project being to reduce the environmental footprint of breweries and their agro-industrial suppliers operating in the Russian Federation as well as proactive investments in institutions and infrastructure for pollution reduction and sustainable water and land management the proposed project is of multi focal nature touching upon three GEF focal area strategies: International Waters, Climate Change and Land Degradation.

The project aims at implementing innovative solutions to reduce pollution, improve water use efficiency, water supply protection and aquifer and catchment protection in transboundary water systems to reduce the water footprint of breweries and their suppliers as well as by other users operating in catchment areas shared with Baltika breweries, which is fully consistent with Outcome 1.3 of Objective 1 of the GEF International Waters focal area strategy.

The proposed project does also promote the demonstration, deployment and transfer of innovative low-carbon technologies and the development of an enabling policy environment and of mechanisms for technology transfer and thus is fully aligned with the objectives 1 and 2 of the GEF focal area strategy for climate change mitigation.

By promoting investments in renewable energy technologies (brewery waste to energy) in the brewery sector in Russia the project is also fully consistent with Objective 3 of the GEF Climate Change mitigation strategy.

By reducing the environmental footprint of agri-industries along the supply chain for breweries the proposed project aims at maintaining the flow of agro-ecosystem services and at reducing pressures on natural resources from competing land uses and thus is full consistent with the GEF Land Degradation Focal Area Objective 1 and 3.

#### **B.3 The GEF Agency's comparative advantage for implementing this project:**

UNIDO focuses its resources and expertise on 3 thematic priorities

- Poverty Reduction through Productive Activities
- Trade Capacity-Building
- Environment and Energy

As the leading service provider for improved industrial efficiency and sustainability in productive processes, UNIDO assists developing countries and economies in transition in reaching their economic and environmental goals while simultaneously implementing multilateral environmental agreements.

UNIDO's Green Industry Policy provides the cross-cutting framework for all technical assistance provided by the organization. Greening of industries is about promoting sustainable patterns of production and consumption. Such patterns are less resources consuming, energy efficient, non polluting and low waste. The greening of industries is about decoupling the consumption of material and energy from production and economic growth and essentially "producing more with less and with drastically reduced environmental impacts".

Through UNIDO's Green Industry Initiative for a low carbon future UNIDO supports her partners in the preparation green industries policies and guidelines, the preparation of country status reports on eco-efficiency, the initiation of green industry policy programmes and reduction of the environmental footprint of industries (low-carbon, low-water, low-pollution and low material inputs) along the value added chain.

To minimize detrimental environmental impacts of industrial production processes UNIDO supports her partners in the identification and clean-up of pollution hot spots, Transfer of Environmentally Sound Technologies (TEST) and cost efficient end of pipe solutions to mitigate industrial pollution as well as to support the development of policies and regulatory frameworks required for the greening of industries.

UNIDO has well established structures in the Russian Federation that will become involved project execution. UNIDO has well as a long standing and sound track record in implementing projects to improve industrial efficiency and reduce the industries' detrimental environmental impacts in the Russian Federation. The Centre for International Industrial Cooperation in the Russian Federation was established in 1989 upon request and with full support of the Government of the Russian Federation as. The Centre with support provided by UNIDO headquarters constitutes the ideal platform for the execution of this project. While the Centre employs in average some 60 highly qualified professional staff with in depth expertise in the fields of cleaner production, resource efficiency, Transfer of Environmentally Sound Technologies and climate change mitigation, the Centre has a vast network of highly qualified and specialized experts, which can be mobilized to support the implementation of this project. Furthermore UNIDO is closely cooperating with the Volga International Cleaner Production Centre and the St. Petersburg National Cleaner Production Centre which are foreseen to become involved in project execution.

UNIDO has successfully completed a multi million US\$ portfolio of projects in the Russian Federation in the field of improving industrial efficiency and reducing environmental pollution related to industrial processes.

On 9 October 2012 JSC Baltika Breweries and UNIDO have signed a Memorandum of Understanding to:

- a) advance environmentally sustainable solutions within in the Russian Federation
- b) to deliver significant environmental benefits by reducing pollution, reducing ghg emissions from breweries and their supply chain, maintaining the flow of agro-ecosystem services and improving the flow regimes of transboundary water systems
- c) supporting the MDGs in the field of environmental sustainability by contributing to reverse the loss of environmental services, by maintaining ecosystem services and by increasing local access to clean water and improved sanitation
- d) improving community health and enhance local livelihoods

**PART III: APPROVAL/ENDORSEMENT BY GEF OPERATIONAL FOCAL POINT(S) AND GEF AGENCY(IES)**

**A. RECORD OF ENDORSEMENT OF GEF OPERATIONAL FOCAL POINT (S) ON BEHALF OF THE GOVERNMENT(S):** (Please attach the [Operational Focal Point endorsement letter\(s\)](#) with this template. For SGP, use this [OFP endorsement letter](#)).

NAME	POSITION	MINISTRY	DATE (MM/dd/yyyy)
Rinat GIZATULIN	Deputy Minister	MINISTRY OF NATURAL RESOURCES AND ENVIRONMENT	04/23/2012

**B. GEF AGENCY(IES) CERTIFICATION**

<b>This request has been prepared in accordance with GEF/LDCF/SCCF/NPIF policies and procedures and meets the GEF/LDCF/SCCF/NPIF criteria for project identification and preparation.</b>					
Agency Coordinator, Agency name	Signature	DATE (MM/dd/yyyy)	Project Contact Person	Telephone	Email Address
Dmitri Piskounov Managing Director, Programme Development and Technical Cooperation Division & Focal Point of GEF, UNIDO		01/23/2013	Christian Susan 	+43 1 26026 3541	c.susan@unido.org

